

WHAT IS CLAIMED IS:

1. A method of manufacturing a laterally diffused metal
oxide semiconductor (LDMOS) device, comprising:

forming an amorphous region in a semiconductor substrate
between isolation structures and adjacent a gate structure by
implanting an amorphizing element in the semiconductor substrate;
and

diffusing a first source/drain dopant laterally in the
amorphous region to form a first portion of a channel.

2. The method as recited in Claim 1 wherein implanting an
amorphizing element includes implanting silicon.

3. The method as recited in Claim 2 wherein implanting
silicon includes implanting silicon with an implant dose of at
least about $1E15$ atoms/cm².

4. The method as recited in Claim 1 wherein implanting an
amorphizing element includes implanting germanium.

5. The method as recited in Claim 4 wherein implanting
germanium includes implanting germanium with an implant dose of at

3 least about $1\text{E}14$ atoms/cm².

6. The method as recited in Claim 1 wherein diffusing a
2 first source/drain dopant in the amorphous region includes
3 diffusing a first P-type source/drain dopant to a depth of about
4 100 nm, and implanting an amorphizing element includes implanting
5 an amorphizing element to a depth ranging from about 180 nm to
6 about 200 nm.

7. The method as recited in Claim 1 wherein diffusing a
2 first source/drain dopant laterally in the amorphous region
3 includes diffusing a first source/drain dopant on a first side of
4 the gate structure and further including diffusing a second
5 source/drain dopant laterally in the semiconductor substrate and on
6 a second side of the gate structure.

8. The method as recited in Claim 1 wherein diffusing a
2 first source/drain dopant includes diffusing a first source/drain
3 dopant at a temperature above about 600°C that re-crystallizes the
4 amorphous region.

9. The method as recited in Claim 1 wherein diffusing a
2 first source/drain dopant includes diffusing a first source/drain

3 dopant having a gaussian distribution within the amorphous region.

10. The method as recited in Claim 1 wherein forming an
2 amorphous region includes forming an amorphous region using an
3 energy ranging from about 50KeV to about 150 KeV.

11. A method of manufacturing an integrated circuit,
comprising:

fabricating laterally diffused metal oxide semiconductor
(LDMOS) transistors, including:

forming an amorphous region in a semiconductor substrate
between isolation structures and adjacent a gate structure by
implanting an amorphizing element in the semiconductor substrate;
and

diffusing a first source/drain dopant laterally in the
amorphous region to form a first portion of a channel;

depositing interlevel dielectric layers over the LDMOS
transistors; and

creating interconnect structures in the interlevel dielectric
layers that interconnect the LDMOS transistors to form an operative
integrated circuit.

12. The method as recited in Claim 11 wherein implanting an
amorphizing element includes implanting silicon.

13. The method as recited in Claim 12 wherein implanting
silicon includes implanting silicon with an implant dose of at
least about $1E15$ atoms/cm².

14. The method as recited in Claim 11 wherein implanting an
amorphizing element includes implanting germanium.

15. The method as recited in Claim 14 wherein implanting
germanium includes implanting germanium with an implant dose of at
least about $1E14$ atoms/cm².

16. The method as recited in Claim 11 wherein diffusing a
first source/drain dopant in the amorphous region includes
diffusing a first P-type dopant to a depth of about 100 nm, and
implanting an amorphizing element includes implanting an
amorphizing element to a depth ranging from about 180 nm to about
200 nm.

17. The method as recited in Claim 11 wherein diffusing a
first source/drain dopant laterally in the amorphous region
includes diffusing a first source/drain dopant on a first side of
the gate structure and further including diffusing a second
source/drain dopant laterally in the semiconductor substrate and on
a second side of the gate structure.

18. The method as recited in Claim 11 wherein diffusing a
first source/drain dopant includes diffusing a first source/drain

3 dopant at a temperature above about 600°C that re-crystallizes the
4 amorphous region.

19. The method as recited in Claim 11 wherein diffusing a
2 first source/drain dopant includes diffusing a first source/drain
3 dopant having a gaussian distribution within the amorphous region.

20. The method as recited in Claim 11 wherein forming an
2 amorphous region includes forming an amorphous region using an
energy ranging from about 50KeV to about 150 KeV.